

by Susan Jewell

A Unified Defense Against Invasive Species



Dandelions
Corel Corp. photo

Long ago, the word “weed” crept into our vocabulary. It identified plants that grew where we didn’t want them. Little did we realize, when we were young, that everything we learned was a weed was most likely an alien plant. These included the dandelion (*Taraxicum officinale*), ox-eye daisy (*Chrysanthemum leucanthemum*), white clover (*Trifolium repens*), and sweet honeysuckle (*Lonicera japonicum*) of the typical American suburban yard, brought from another continent intentionally or by accident. Homesick colonists brought their favorite flowers, medicinals, and edibles from the Old World. Lodged in the hooves of livestock were seeds from European pastures. By the time we recognized these plants as a problem, most Americans assumed they had always been here.

Now we recognize that invasives (alien species whose introduction causes or is likely to cause harm to the economy, environment, or human health) are not just an inconvenient affront to our landscaping efforts. Federal agencies spent \$631.5 million on invasive species issues in FY 2000, with about \$31 million coming from the Department of the Interior. The spread of invasives is estimated to cost Americans as much as \$138 billion annually in crop, timber, and commercial fishing losses; human health problems; navigational (e.g., boating) interference; and damage to structures. Add to that the immeasurable damage caused by introduced organisms that injure or kill people or cause native species to go extinct, such as West Nile virus, smallpox, Africanized bees (*Apis mellifera scutellata*), and brown tree snakes

(*Boiga irregularis*), and you get a problem of incalculable dimensions across North America.

In 1904, a fungus (*Cryphonectria parasitica*) from Asia that was first discovered in New York City cost us our precious American chestnut trees (*Castanea dentata*). These trees, giants among the eastern deciduous forests from Maine to Georgia and west to the Ohio River Valley, were a staple of the Appalachian settlers. Their straight trunks, sometimes branchless for 50 feet (15 meters), could grow to ten feet (3 m) in diameter and provided ample rot-resistant lumber. The chestnuts nourished the locals and their livestock, provided cash from their sale to big cities by the box car, and fed such game species as bears, deer, squirrels, and turkeys. The blight swept through nine million acres (3.6 million hectares)

of eastern woodlands, killing all adult chestnut trees in the United States. Now, only an occasional sprout appears from a stump, only to die when its bark is old enough to fissure. A few large healthy trees remain in Canada. The economic hardship to homesteaders can't be estimated, nor can the loss of the mast crop to wildlife.

Since the early Spanish explorers released pigs into Florida in the 1500s, alien species have been arriving on our shores virtually nonstop. An estimated 50,000 species of plants and animals have been introduced into the United States. More than 200 species, such as hydrilla (*Hydrilla verticillata*), were from the aquarium industry alone.

Approximately 35-46 percent of the species on the endangered species list are there partly or entirely because of the effects of invasive species (Wilcove et al. 1998). This doesn't even count species like the American chestnut, which functionally died out before the Endangered Species Act was passed and therefore is not listed. The threats posed by some species are obvious; for example, Norway rats (*Rattus norvegicus*) are decimating seabird colonies on islands in Alaska where mammalian predators were naturally absent. Zebra mussels (*Dreissena polymorpha*) are clogging intake pipes, encrusting ship hulls and propellers, and smothering native mussels. Other examples are subtle; endangered southwestern willow flycatchers (*Empidonax trailii extimus*) are heavily dependent on willows, which are being displaced by non-native saltcedars (*Tamarix* spp.) in the Southwest.

What is the Federal government doing to stop this flood of new introduced species and control the spread of existing ones? Many applicable laws, such as the Plant Quarantine Act, the Animal Damage Control Act, the Federal Plant Pest Act, National Environmental Policy Act, the Endangered Species Act, and the Federal Noxious Weed Act, have been in effect for decades. Since 1990, the Service and National Marine



Fisheries Service have co-chaired the Aquatic Nuisance Species Task Force, established by the Non-Indigenous Aquatic Nuisance Prevention and Control Act. This Act was designed to prevent the introduction of and to control the spread of aquatic species and the brown tree snake. Furthermore, the Federal Interagency Committee for Management of Noxious and Exotic Weeds, focuses on integrated ecological approaches on Federal lands.

More recently (on February 3, 1999), President Clinton signed Executive Order 13112 on Invasive Species, which requires all Federal agencies whose actions may involve invasive species to join in the war to control their spread. The order created an Invasive Species Council that is chaired by the Secretaries of Interior, Agriculture, and Commerce,

Old World climbing fern (*Lygodium microphyllum*), a true fern which probably entered south Florida through a plant nursery, is native to Southeast Asia. It can grow in wet or dry habitats and can climb 30 feet (9m) up a tree and shade it to death. In the Everglades, it blankets entire tree islands.

Photo by Susan Jewell



Like the zebra mussel, the round goby, an invasive fish species from Eurasia, probably entered North America in the discharged ballast water of visiting ships. It competes with, and preys upon, native fishes.

Photo by David Jude

and includes the Departments of State, Treasury, Defense, and Transportation and the Environmental Protection Agency. On October 2, 2000, the Council released a draft National Invasive Species Management Plan outlining a coordinated strategy by the Federal agencies. This working document will be updated every two years.

The plan calls for some steps to be taken individually by Federal agencies and some jointly. Examples of action items include:

- **coordination and leadership**—establishing an oversight mechanism to comply with the executive order; setting up dispute resolution mechanisms; and analyzing legal and policy barriers;
- **prevention**—developing a screening system for evaluating intentionally introduced species;
- **early detection**—using the expertise of taxonomic experts; researching new methods of detection; providing an efficient means to notify Federal, State, tribal, and local agencies; and periodic species surveys in “hot spots” (such as near ports of entry);
- **rapid response**—establishing teams that can react quickly to control an

introduction of invasive species; determining which responses are most appropriate; and preparing a guide to assist the teams;

- **control and management**—providing more funding to Federal agencies; issuing instructions to Federal agencies to incorporate invasive species control in management plans; identifying exclusion methods for preventing the unwanted spread of species; accelerating the biological control program; and identifying interconnecting waterways and ways to block the spread of unwanted species;
- **international cooperation**—increasing global awareness of invasive species problems; and providing assistance to collect information on species in other countries;
- **research**—studying how invasive species can alter water chemistry, nutrient cycling, and otherwise alter natural habitats;
- **information management**—maintaining and enhancing the website (see below); linking the Council to all major databases; and
- **education and public awareness**—assessing the current invasive species communications, education, and outreach programs.

Mike Ielmini, the Invasive Species Coordinator for the Service’s National Wildlife Refuge System, believes, “There isn’t a branch of the Service that isn’t affected by invasives. We need to put an invasive species component in every management plan we do and always be thinking of ways to solve the problem.”

Susan Jewell is a biologist with the Division of Endangered Species in the Service’s Arlington, Virginia, headquarters office.

References

- Wilcove, D.S., Rothstein, J. Dubrow, A. Phillips, and E. Losos. 1998. Quantifying threats to imperiled species in the United States. *BioScience* 48:607-615.